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July 10, 1995

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JUL 10 1995

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF SECRETARY

**BY HAND DELIVERY**

William F. Caton  
Acting Secretary  
Federal Communications Commission  
1919 M Street, N.W., Room 222  
Washington, D.C. 20554

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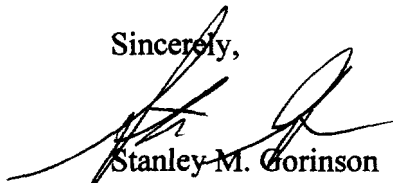
Re: **In the Matter of Allocation of Spectrum in the 5GHz Band to  
Establish a Wireless Component of The National Information  
Infrastructure--RM-8653**

Dear Mr. Caton:

Please find enclosed for filing the original and four (4) copies of the Comments of  
Microsoft Corporation in response to the Apple Computer, Inc. Petition for Rulemaking RM  
Docket No. 8653

If you have any questions or need any additional information please feel free to contact  
me.

Sincerely,



Stanley M. Gorinson

Enclosures

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List A B C D E 0 E T

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cc: Chairman Reed E. Hundt  
Commissioner Andrew C. Barrett  
Commissioner Rachelle B. Chong  
Commissioner Susan Ness  
Commissioner James Quello  
International Transcription Services, Inc.

**BEFORE THE  
FEDERAL COMMUNICATIONS COMMISSION  
WASHINGTON, D.C.**

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OFFICE OF SECRETARY**

**IN RE:**

**WIRELESS INFORMATION  
NETWORKS FORUM  
PETITION FOR RULEMAKING**

**RM - 8653**

**IN RE:**

**APPLE COMPUTER, INC.  
PETITION FOR RULEMAKING  
"NII BAND"**

**DOCKET FILE COPY ORIGINAL**

**COMMENTS OF MICROSOFT CORPORATION**

**Jack Krumholtz  
Law and Corporate Affairs Department  
Microsoft Corporation  
Suite 500  
5335 Wisconsin Avenue, N.W.  
Washington, D.C. 20015**

**July 10, 1995**

**BEFORE THE  
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PETITION FOR RULEMAKING**

**RM -- 8653**

**IN RE:**

**APPLE COMPUTER, INC.  
PETITION FOR RULEMAKING  
"NII BAND"**

**COMMENTS OF MICROSOFT CORPORATION**

Microsoft Corporation is a developer of personal computer applications and operating systems software for personal computers. Microsoft believes the National Information Infrastructure ("NII") is of vital importance to the future of this country and the NII must be promoted if the United States is to remain a technological leader in the 21st century. The petitions for rulemaking filed by Wireless Information Networks Forum and Apple Computer, Inc. ("the Petitioners") propose an allocation of up to 300 MHz of spectrum for high speed wireless data applications. Microsoft supports these petitions to allocate spectrum to unlicensed, cooperating wireless data devices. Such an allocation would be an important ramp onto the Information Highway. Microsoft also urges the Commission to enact at most a minimal set of

rules for the NII Band so that market forces rather than government shape the direction of the new services that emanate from the band.

## **I. DISCUSSION**

### **A. The Demand for Wireless Data**

The nature of data is changing rapidly. Until very recently, *data* meant textual information. Then, as we entered the digital age, information migrated to the multimedia realm, incorporating text, images, digital audio and digital video. In a short span of time, the bandwidth requirements for computer data networking have increased by orders of magnitude. Spectrum allocations designed for wireless data must reflect these bandwidth realities. To improve accessibility, usability, and to lower costs, wireless networking must be considered an essential component of the NII.

### **B. Potential Uses for the NII Band**

There are a variety of uses in which the NII Band might speed the introduction of new services:

1. Due to infrastructure costs, there are many parts of our nation that may not be wired with high speed fiber or coaxial connectors. These include small towns, rural areas, and poverty stricken areas. The lack of a truly ubiquitous data infrastructure will produce communities of "haves" and "have nots." As Chairman Hundt has stated, "The difference between having and not having modern communications in your community in the 21st century will be similar to the significance in the 19th century of having the railroad reach you or not."<sup>1</sup> A

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<sup>1</sup> Reed E. Hundt, Speech at the Annual Legislative Conference of the National Association of Counties in Washington, D.C. (Mar. 5, 1995).

wireless-based infrastructure is the most cost-effective method to provide physical and high-speed access to the NII to all of our citizens.

2. Educational applications are almost limitless. The cost of physically wiring a network tap to every child's desktop is phenomenal. Most classrooms today lack even a single telephone line. Broadband wireless networks will provide a cost-effective solution -- schools can be quickly configured and reconfigured without tearing up hallways and buildings.<sup>2</sup> Imagine students in a high-school biology class using the future capabilities of the Internet to watch a live digital video broadcast of a university professor demonstrating potential uses of recombinant DNA with each student able to select different viewing angles -- *e.g.*, the professor, the labs, the microscope. Moreover, the school library will be in the hands of each student who can browse the Internet to gain access to a multimedia array of services.

3. The NII Band will also have important benefits for health care. Wireless networks will permit physicians to review digitally-transmitted X-rays, computer aided-tomography, full-motion ultra-sound imaging studies, and magnetic resource imaging diagnostics while at the patient's bedside. This wireless technological revolution has the potential to significantly improve the quality of health care.

There are many other examples of how wireless networks will reduce costs, increase quality and provide a better quality of life for our citizens in numerous applications.

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<sup>2</sup> Wireless networks give educational institutions a flexibility they presently lack. As schools go on-line they would have the option of incrementally adding wireless networking support to their classrooms. Eventually, as usage increased they could elect to switch to fiber.

**C. Adequate Spectrum Must Be Allocated for the NII Band**

All existing unlicensed bands are shared with many other radio services. And, given the existing hierarchy of use which exists in most bands, unlicensed Part 15 devices have only a secondary existence -- *i.e.*, Part 15 devices must not interfere with licensed services but must accept interference from those licensed services in the band. Unlicensed services need adequate and appropriate spectrum.

Microsoft believes that the Petitioners for allocations in the 5 GHz band deserve serious consideration by the Commission. An adequate allocation, whether governed by Part 15 or "Part 16" rules, is necessary to realize the potential for the new applications we discussed earlier.

WINForum proposes that the 250 MHz is needed in the near term and that 350 MHz will be needed ultimately for what it calls SUPERNET. Apple asks for 300 MHz. Both desire some form of technical rules, with WINForum urging that technical rules be left to the private sector while Apple argues that there must be government-promoted technical rules which it terms "minimal" to promote "equal access."

Microsoft believes the initial allocation should be at least 300 MHz since that will assure an adequate amount of spectrum for initial applications. Moreover, the Commission must also assure an adequate reserve of at least 50 MHz so that as usage increases wireless capacity will make high-speed connections possible (13-26 MBps) and wide enough to enable cooperative sharing of frequencies through spectrum efficient technologies such as variable bit-rate spread spectrum technology.

Microsoft also believes that unlicensed frequencies should not be auctioned but instead should be open to all who seek to use that spectrum. If access to these frequencies is auctioned,

ubiquitous access to the NII will not happen and will not be available to all at the lowest cost possible.

It is premature to specify much about the technology to be deployed. The allocation approved by the Commission should have a minimal set of rules attached to it and must be flexible enough to accommodate both channelized access and broadband spread spectrum techniques. Power and antenna constraints should be flexible to enable useful coverage areas so that a single device could provide neighborhood or campus-wide access or powered at a low level for wireless LAN access.

However, the "NII Band" concept is far too young to begin discussions of standards. The marketplace should develop those standards either directly or, if possible, through industry consensus. Even "industry standards" may be premature if the effect of such standards is to unduly restrict innovation and the potential of wireless networks. "Standardization" is all too often an effort to "level the playing field" to permit the least capable firms to participate, thereby increasing consumer costs and inhibiting innovation. Accordingly, "interoperability," is unwarranted and should not be promoted until and unless there is sufficient evidence of market failure. There is no such evidence in the nascent NII Band which will only come into existence if this allocation is approved.

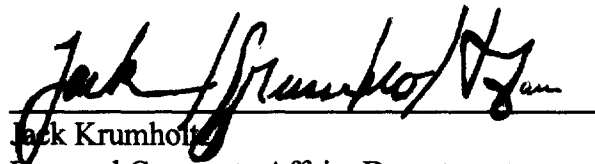
## **II. CONCLUSION**

Microsoft urges the Commission to seize this historic opportunity to allocate wireless data spectrum of at least 300 MHz with an adequate reserve. Now is the time to begin a rulemaking to

enable the Internet and electronic information publishing -- the 21st century equivalent of the impact of Guttenberg's printing press -- to flourish and empower a better America.

Respectfully submitted,

MICROSOFT CORPORATION

A handwritten signature in black ink, appearing to read "Jack Krumholz", is written over a horizontal line.

Jack Krumholz  
Law and Corporate Affairs Department  
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5335 Wisconsin Avenue, N.W.  
Washington, D.C. 20015

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